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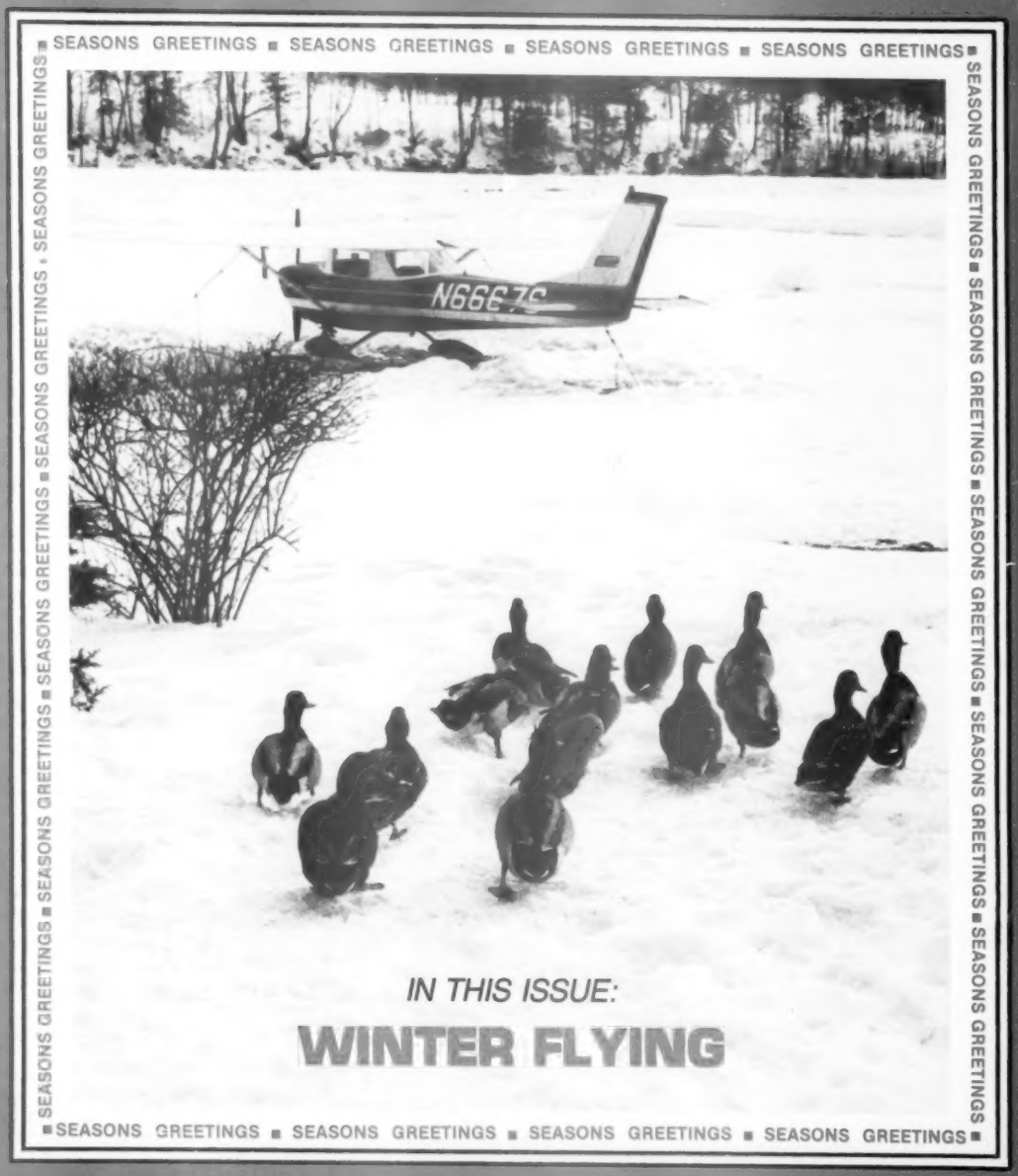
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BRIEFS

ELECTRONIC INTERFERENCE. Passenger use of portable computers, calculators, and electronic games aboard aircraft does not interfere with aircraft radio and navigation equipment. FAA has found no basis for banning the use of these devices in flight, although they must be stowed during takeoff and landing. Proven sources of interference, such as walkie-talkies, radio-controlled toys, portable telephones, AM/FM radios, and portable televisions continue to be prohibited at all times.

HOME WEATHER BRIEFING. A "Direct User Access Terminal" is currently being tested by FAA's Technical Center in the field in the New Jersey, Delaware, and eastern Pennsylvania area. For this preliminary test, pilots will use terminals set up at the Millville, NJ FSS and at the following airports:

Bader Field, Atlantic City; Capitol City Airport, Harrisburg, PA; Philadelphia International Airport; Flying "W" Ranch, Medford, NJ; Cape May County Airport, Cape May, NJ; Robert Miller Airport, Toms River, NJ; Northeast Philadelphia Airport, and Wilmington-New Castle Airport, DE.

CHRISTMAS BONUS. Having one of the new fuel port kits that will only accept Avgas nozzles installed is good insurance against a misfueling accident. In fact, some insurance companies are so convinced these kits will save lives and prevent accidents that they will reimburse clients for installation.

WALKABOUT WISDOM. Dick Pearson of Brantford, ONT (Canada), at 90 perhaps the oldest active pilot in North America, credits his meticulous preflight investigations for his longevity.

LANDING SIGNALS. Pilots who have occasion to use the pulsating light type of visual approach aid should understand that there are two approved systems, with different signals. PLASI shows a pulsating white light when the approach is too high, a steady white light for on-glidepath, a steady red light for slightly below glidepath, and a pulsating red light for well below glide path. ARINCO displays a pulsating white light for above glidepath, an alternating red and white light for on glidepath, and a pulsating red light for below glidepath.

AIRCRAFT MARKINGS

In the past 20 years there have been several changes to Federal Aviation Regulation Part 45 regarding the size and location of N-numbers on aircraft that have affected the exterior decorations as a whole. The next time your aircraft is due to be repainted you should be aware of the current specifications. Even if the job is done by professionals, if you impose your ideas on the painters you may wind up with something unacceptable to FAA as it could be that your ideas for decoration and the regulations will not agree.

Originally the N-number was painted on an aircraft upper and lower wing, or on the bottom of helicopters. But in the Sixties, about the time of the Cuban missile crisis, the U.S. Air Force became concerned about identifying civilian aircraft flying near or in restricted areas, especially those flying in the Gulf or South Atlantic area. The positioning of Air Force planes underneath possible airspace intruders, in order to read the numbers, was found to be extremely hazardous. Accordingly, FAA changed the rule to require at least 12 inch numbers to be painted on the fuselage sides—a position more readily visible to those in the air as well as those on the ground, unless the aircraft was directly overhead.

In 1977, as a result of an EAA petition requesting smaller numbers to accommodate their smaller planes, and to enhance the decor of aircraft in general, FAA agreed to a reduction in number size from 12 to 3 inches. This "experiment" ended four years later, in 1981, after a deluge of petitions from drug and law enforcement officials, plus the general public, complaining of the difficulty they were having in spotting the numbers in order to report violations.

The N-number minimum size then went back to 12 inches, with the stipulation that the change need not be made on existing aircraft (except newly, manufactured aircraft) until the aircraft was repainted. Antique (built over 30 years ago) or replica aircraft were allowed to continue to use the 3 inch numbers. FAA has projected that all aircraft affected by the rule will have been repainted, including the change to 12 inch numbers, by 1988.

In 1983 the wheel of change caught up with rotorcraft. Until this change the N-number on a rotorcraft was painted in 2 to 6 inch numbers on the side surfaces and 20 inches or 4/5 as high as the fuselage is wide (whichever was less) on the bottom surface. This was a carry over from the pre-Sixties style of marking, which have never been changed for rotorcraft. Currently Part 45 states that the N-number will be displayed 12 inches high on both vertical surfaces of the fuselage, boom, or tail, in a position that will not be obscured during flight or on the ground.

If you choose, the numbers may be put on

hinged or sliding doors that must be in place during flight; but they cannot be placed on the fuselage near a door where the numbers would be obscured if the door is open during flight. You may also position the numbers on the tailfin—as long as the rotor blades, guards, or other appurtences do not obstruct the numbers. Remember, vertical or angled arrangement (reading down or uphill) of N-numbers on rotorcraft is not permitted. They must always be positioned horizontally on whatever surface they are displayed.

Here are a few other things you should remember when repainting

- The numbers should be of a permanent nature. Water-based paints or peelable tape is not acceptable.
- Any plans for displaying company names, trademarks, decorations, etc. on adjoining areas should be submitted to your local FAA inspector to determine the suitability.
- There should be no ornamentation between or around the N-numbers. However, if shading or bordering is used to make the numbers more legible or conspicious, this is not considered ornamentation.
- FAR Part 45.29 sets down the size requirements for N-numbers indicating 12 inches as the basic height and the proportional width, thickness and spacing as well as exceptions to the rule (see chart).

Professional aircraft maintenance shops should be familiar with the specifications for number/letter width, thickness, spacing, etc. as detailed in FAR 45.29, but if you do your own decorating you will have to go by the book. For additional information contact your local FAA District Office. ■

Size and Location of Markings

Aircraft type	Minimum Size	Location
Airplane	12 inches	vertical surfaces of tail or fuselage
Glider	3 inches	vertical surfaces of tail or fuselage
Replica, Antique*	3 inches	vertical surfaces of tail or fuselage
Rotorcraft	12 inches	vertical surfaces of cabin, fuselage, boom or tail
Balloon	3 inches	spherical - diametrically opposite at equator non-spherical - at maximum cross section directly above rigging band or basket attach point

*See Federal Aviation Regulation Part 45.22 for rules regarding exhibition antique, and experimental aircraft.

Winter Flying: Good News and Bad

Where and Why They Go Down

Winter flying accidents have a way of sticking in the public eye, since the rigors of cold weather exposure and subzero survival are often dramatized in the press. Cold weather does change the flight environment, to be sure, and many general aviation pilots are in the habit of parking their aircraft for a two-to-three month period of disuse, once the sound of sleighbells (electronically speaking) ushers in the winter season in earnest.

No quarrel with this practice, but it is interesting to observe that cold temperatures, ice, and snow figure in only a small percentage of the wintertime accidents. For example, the latest Annual Review of Aircraft Accident Data, provided by the National Transportation Safety Board, shows that during the month of January there were 182 general aviation accidents nationwide, of which only about 20 (11%) had anything to do with cold weather. And those accidents were chiefly confined to mountainous areas, overflown frequently in IFR or marginally VFR weather, often at night and frequently against the advice of air traffic.

Accidents blamed on wintry conditions most often take place on or near the western slopes of the three major mountain ranges: the Sierra Cascades along the Pacific coast, the Rockies, and the Appalachians. General aviation pilots who avoid these areas or who take a very cautious and conservative attitude toward weather reports and forecasts are not likely to experience unusual difficulties.

Relatively flat areas like the great central plains, or the southeastern states, are fairly free of cold weather accidents—with certain exceptions, notably Texas and some of the Great Lakes states. Overall, the air is more stable once the winter settles in, and there is less precipitation than in the summer. As the continental map shows, even the far northern plains states, like the Dakotas and Nebraska, have few or no accidents attributed to wintry conditions, despite the fact that semi-Arctic temperatures may be experienced.

On the other hand, accidents that are blamed on cold weather effects have a high fatality rate. Of the 83 accidents in 1982 involving ice or snow or freezing temperatures, 43 were fatal, with 96 fatalities, according to the Safety Board.

Inflight icing—especially structural icing—is a major cause of winter accidents. As the season progresses, the freezing zone extends farther southward and closer to the surface. The forecast "icing in clouds" becomes an increasing threat to IFR operations. As Table 1 indicates, a large portion of the 1982 cold weather accidents took place in IFR weather, often at night. Many of the pilots took off without a weather briefing or a flight plan, and some non-instrument rated pilots insisted on flying in spite of ATC warnings that conditions were marginal or unsafe.

Icing in clouds is a phenomenon that can be predicted with fair accuracy as to general areas and altitudes, but the severity of the

Table 1. WINTER ACCIDENTS 1982

	Total	IFR Flight Plan	VFR Flight Plan	No Flight Plan	Proceeded Against ATC Recommendation
All Accidents	83	37	9	37	33
Fatal Accidents	43	15	6	32	19
Fatalities	96	40	13	41	39
Night Flights	40	21	2	17	14

icing in exact localities is not measurable by instruments. We depend on pilot reports for this information, which means that it is subjective rather than scientific. It pays to get as many PIREPs on this subject as possible before venturing into predicted icing conditions, and to make sure of their timeliness—i.e., they should be less than an hour old, as the severity of icing can alter within minutes.

Getting an update on icing conditions is also important before beginning a letdown to an instrument approach, when the surface temperature is near or below freezing and there is moisture in the air or on the airplane. The slow airspeed, low engine rpm, reduced heat, and the nose-high attitude of the aircraft are all conducive to structural icing. With ice, the disruption of normal airflow may make it impossible to keep the airplane flying long enough to reach the runway, let alone climb out through a missed approach. In aircraft which depend on exhaust-heated air to keep the windshield clear, sufficient heat to prevent icing may not be available at reduced power.

The exact nature and function of your ice-protection systems should be understood. Some light aircraft have only an anti-icing spray, which is of limited value in resisting the onset of icing, and of no value for removing adhering ice. Optionally available de-icing equipment such as de-icing "boots" for the wing and empennage can be temporarily helpful if an aircraft encounters icing aloft unexpectedly, but these alone may be completely inadequate for flight into known icing conditions.

In accordance with the FARs, this type of flying may only be undertaken with an aircraft which is described by the manufacturer as being certificated for operation in designated types of icing conditions, when flown by a qualified and current instrument-rated pilot. One Cessna light twin requires, in addition to airfoil de-icing boots: propeller de-icing boots, electrically heated windshield, heated stall-warning vane, heated wing locker fuel tank vents, heated pitot source, heated static sources, and 100 amp alternators for adequate power. Special external lighting may also be required for monitoring the wing boots.

Further, FAR Part 23.1419 states that an analysis must be performed to assure the adequacy of the ice protection system for any given model and make of aircraft. (Certain airplanes, because of their design, are simply not capable of being fully protected from icing problems without exorbitant costs.)

In any conditions that are conducive to icing, even if no structural icing is discernible, pilots should pay close attention to the pitot/static system and the instruments these affect: principally the altimeter, rate-of-climb indicator, and airspeed indicator. Even on clear but cold days the air openings can become frozen over if the aircraft is spattered with slush or blowing surface snow prior to takeoff.

A zero airspeed reading during flight can result from blockage of the ram air input. If the static port is also sealed, the airspeed indicator will show no change in level flight regardless of power setting; and the airspeed will appear to increase during a climb, and decrease during a descent. Performing occasional instrument crosschecks (i.e., pitch and power references) to verify readings is a good safety precaution.

Freezing in VFR conditions sometimes occurs during rain showers. The rain may be supercooled water, the outside air temperature may be at or near freezing, or the airplane may be "cold-soaked" from flight at higher altitudes or from standing outside overnight on the ramp. In the presence of moisture, the pilot should be prepared for a possible sudden coating of ice over any portion of the airplane. Freezing rain can be more dangerous than icing in clouds.

Nighttime IFR operations in winter call for constant vigilance in regard to icing in rain. As an illustration of how quickly conditions can change, consider the following situation in which the pilot lost both lift and visibility at a point where a safe touchdown seemed assured.

The flight, from Chicago to Valparaiso, IN, was undertaken in a PA–30 *Navajo* late at night on March 4, 1982. During the letdown and approach to his destination, with the OAT just above freezing, the pilot experienced rain showers. As the runway came into view he canceled his IFR flight plan and prepared to land. Abruptly the *Navajo* began to sink, and even with full power the pilot was unable to keep the aircraft from descending sharply, due to the rapid ice build-up on the wing. The airplane slammed into the ground 78 feet short of the runway and bounced back up into the air, still under full power. The pilot immediately retracted his landing gear, in a last-ditch effort to regain lift.

By this time his windshield had iced over to the point where he could no longer see ahead. Luckily he was able to maneuver the airplane over the taxiway, which he could see out of his side window. He accomplished a wheels-up landing at a high rate of speed but with no serious injury to himself or his two passengers.

Less fortunate were the pilot and two passengers of Cessna 340A who attempted to fly from Van Nuys, CA to Las Vegas on a dark, rainy night on March 20, 1982. Shortly after taking off with an IFR flight plan, at 11:30 p.m., the pilot radioed that he was having difficulty maintaining airspeed. Soon afterwards he declared an emergency. Radio and radar contact were almost immediately disrupted. The aircraft wreckage was located the following morning on a peak in the San Bernardino Mountains, with no survivors.

Investigators for the Safety Board determined that the 340 had impacted in a nearly vertical attitude, and concluded that the probable cause of loss of control was ice accumulation. The weather forecast had called for "moderate to light icing in clouds," and the light twin was not certificated for flight into icing conditions.

Clouds are not the only cause of structural icing in flight—sometimes injudicious maintenance is a contributing factor. For example, overzealous washing of the aircraft can rob it of protective agents, setting the stage for freeze-up of control hinges.

An accident of this nature occurred at Co-

lumbus, OH on February 16, 1982 during the landing of a Beech 90 *King Air*. The twin Beech had departed Macon County Airport in Georgia shortly after noon. Heavy rain had been falling at Macon, and the pilot reported climbing out through moderate to heavy rain at lower altitudes, en route to his assigned cruising altitude of 17,000 feet. He had filed IFR for Mansfield, OH. On leveling off he observed that outside air temperature was −25°F.

During cruise, with the autopilot engaged, the pilot found some difficulty maintaining altitude, and finally determined that the elevator trim mechanism was "frozen," either literally or otherwise. He disengaged the autopilot and with ATC approval descended to a lower cruise altitude. However, the elevator trim problem persisted, and during his ILS approach to Mansfield he was unable to prevent the *King Air* from descending below the glide path. About two miles short of the runway he collided with a 35-foot high TV antenna. The impact damaged a portion of his right wingtip.

According to the Safety Board, the pilot then executed a missed approach and eventually proceeded to his alternate destination airport at Columbus, OH. Despite the damaged wing and a stuck nose gear which failed to extend, the pilot was able to land safely at Columbus in instrument conditions, with feathered props.

During the investigation that followed, the manufacturer's representative referenced a Beechcraft "Safety Communique" dated May 8, 1981, which had been issued following a series of frozen trim tab occurrences with Beech twins. In each case the aircraft had been washed with a strong soap solution, applied with high pressure hoses, at some point prior to the incident; had also been exposed to heavy rain; and had been cruising at a high altitude in subfreezing temperatures when the problem occurred.

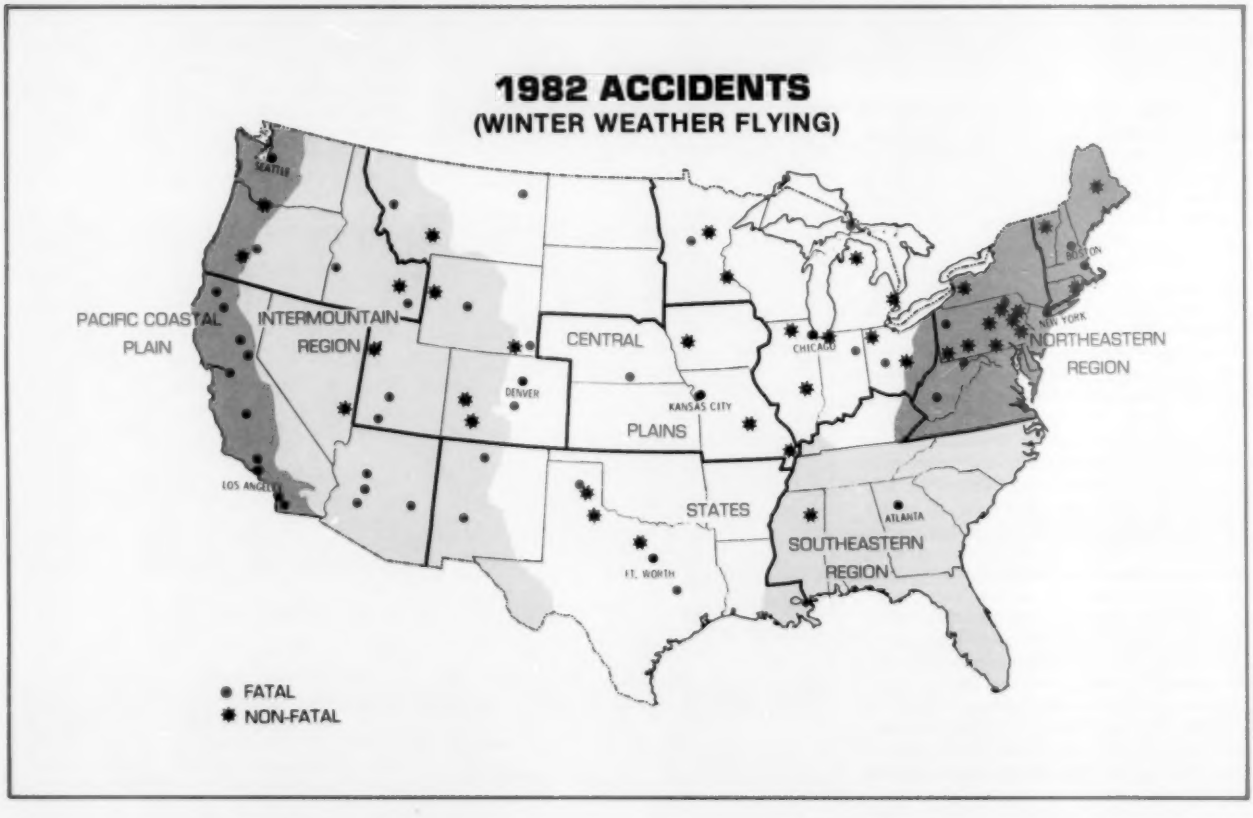
Beech engineers concluded that high-pressure washing had removed the protective lubricant in the hinges of the trim mechanism, allowing water to enter the hinges and eventually freeze at altitude. This process was demonstrated with test flights, and it was shown that in most cases the trim hinges became unstuck following flight at lower altitudes in warmer air. When the lubricant was replaced in the hinges there was no further difficulty.

Owners were also advised that during washing, high-pressure hoses should not be directed at the aircraft *from behind the wing or tail section*, since water could become trapped internally in various control mechanisms and inhibit their movement, or result in inflight flutter (structural vibration) when exposed to freezing conditions. Icing flutter is a very serious matter, and can lead to separation of the affected structure unless relieved promptly by reduced airspeed.

Snowfall is another winter flight phenomenon that causes accidents, especially to non-instrument rated pilots. Snow obliterates familiar landmarks, as well as visibility; more pilots get lost in the wintertime than in any other season. Disorientation and even vertigo are common, when VFR-only pilots find themselves hemmed in by the white stuff.

Loss of visibility takes place very quickly in winter, with rain changing over to snow in the twinkling of an eye. The pilot who is not alert to the overall weather development in his area of flight—especially as regards temperature fluctuations—may find that by the time he observes the rain showers up ahead turning to snow and decides to turn back, the snow is already falling behind him. Once again, the problem is compounded by flight at night, when it is more difficult to see what is happening on all sides.

A grim example of this type of accident occurred in the high plateau country of central Arizona. On the evening of February 7,



1982, the pilot of an on-demand air taxi service agreed to fly three passengers from Phoenix to Flagstaff, AZ. Weather observations for Flagstaff included 800 feet overcast, visibility three miles with light snow showers and fog.

The pilot was quoted as saying that he had just returned from a flight in that area and knew that he could return VFR. According to the Safety Board's report, the four persons departed Phoenix in a single engine Cessna 210 at approximately 8:00 p.m., with no flight plan. The pilot radioed ATC that he was flying at 7,500 feet below an overcast of unknown altitude. Shortly afterwards the 210 collided with trees and crashed at an elevation of 7,000 feet on a snow-covered, wooded plateau between Sedonia and Flagstaff. *Four fatalities.*

A similar tragedy befell the occupants of a Mooney MK20, during an attempted VFR night flight from Wilmington, DE to Cincinnati, OH on the night of March 26, 1982. Although weather reports indicated instrument conditions along his intended flight path, and snow in the intervening Allegheny Mountains, the pilot filed a VFR flight plan, saying that he had monitored weather reports for the area throughout the day. He declined a weather update, but was given a SIGMET (severe weather warning). The Mooney departed at approximately 8:00 p.m. and was last seen flying toward the Allegheny Mountains during a heavy snowfall. The wreckage was found near McHenry, in western Maryland. *Three fatalities.*

Taxiing. Snow and ice on the ground can also be a problem for winter flyers, although usually these accidents do not generate as many fatalities or serious injuries as those we have been discussing. Nevertheless, ground operations are very much affected by frozen precipitation and call for special techniques to avoid overruns, aborted takeoffs, and loss of control.

Even a normally simple procedure like taxiing can become a nightmare on a blustery, slick-frozen surface, when braking is almost nil and nose-wheel steering capability little better. In fact, veteran snow country pilots often advise you to taxi on snow "As though you have no brakes or steerability," using the rudder and the ailerons to turn (down aileron in the direction of turn—opposite to inflight practice). Remember that in cold weather you will have above-normal propeller thrust, so keep the taxi rpm low. If you are taxiing in toward the ramp, expect surface conditions to worsen, as a result of anti-icing fluid drippings on the snow. In close quarters, shut down early if you cannot get assistance from ramp attendants.

Takeoff. Any amount of snow, ice or slush on the runway will lengthen your required takeoff roll—the question is, *how much?* Or, *is there enough runway?* The following is a rough guide for hard surface runways compiled by one experienced air carrier pilot for large aircraft:

1. Damp, light patches of snow. Add 10% to normal takeoff requirements.
2. Sanded, compacted snow, air temperature below 5°F. Add 20%.
3. Compacted snow, temperature above 5°F. Add 30%.
4. Wet ice, with standing water, temperature above freezing. Take off may not be advisable. In fact, you may never fully reach liftoff speed, if you require more than 80 knots, so maybe you had better wait for the plow. Certainly takeoffs are not recommended in deep slush. If you have to abort you will need far more than the normal amount of stopping distance.

Crosswind limitations must also be reduced for taking off on snow or ice. The limit should be reduced significantly for unsanded dry snow, and even more for wet, icy surfaces. In making your calculation, note that very high snow banks can hide the full strength of a crosswind, and strike you with full force only after you have lifted off.

Landing. The additional runway needed for landing on snow or ice is even greater than the takeoff requirements. In general, the heavier the aircraft the greater the proportion of additional runway needed. Jet air carriers may need as much as 160% more runway. Light aircraft have much less momentum to dissipate, of course, but nevertheless you should anticipate zero braking and perhaps a 50% greater stopping distance from touchdown. Here again, the wetter the snow and the warmer the air temperature, the longer you will slide.

In any event, when landing in these conditions plan to touch down at the slowest possible airspeed. NEVER LAND DOWNHILL! Keep the aircraft lined up straight with the runway (which may not be well defined under snow cover) and stay off the brakes at least until the airplane starts to slow down and you can feel something solid under the wheels.

O.K.! You're home for the holidays. ■

TYPICAL WINTER WEATHER IN SELECTED REGIONS

REGION	PREDOMINANT TERRAIN	WIND, RAIN, SNOW	VISIBILITY, ICING (surface to 25,000 ft)
PACIFIC COASTAL: Calif., Ore., Wash. (west of Sierra/Cascade ranges)	Coastal mountains, valleys, desert, running North-South.	**Wind:** strong, westerly. **Precipitation:** 17-22 days per month, except Southern Calif. (4-5 days.) Heavy snow in higher mountains.	**Aircraft Icing:** Occurs 35% of winter in Oregon, Wash.; 5-20% of winter in California. ***VFR:** 70-75% of winter along the seacoast; 85-90% inland.
INTERMOUNTAIN: Eastern Wash. & Ore., Mont., Idaho, Wyo., Utah, Nev., Ariz.	High rolling plateaus, desert, some mountains over 14,000 ft.	**Wind:** westerly, strong; severe gusts in low pressure areas. **Precipitation:** North of Salt Lake, 9-15 days per month; to the south, 6-9 days except for southern Ariz. (2-3 days).	**Aircraft Icing:** hazardous 35% of winter north of Salt Lake; 5-20% to the south. ***VFR:** 85-90% of winter
CENTRAL PLAINS: N.D., Minn., Wis., Iowa, S.D., Neb., Colo., Kans., Mo., Ind., Mich., N.M., Okla., Ark., Tex., Western La.	Vast plains with mountains and high plateaus in western section.	**Wind:** strong, northwesterly; may shift to southwest prior to frontal passage. **Foehn** (dry winds in excess of 25 mph) occurs 5-10% of winter, especially on slopes of Rockies. **Precipitation:** 6-12 days per month, but much wetter on lee side of Great Lakes. Dryer generally in the southwestern states (N.M., Okla. & Tex., 1-5 days).	**Aircraft Icing:** Occurs 5-30% of winter in the northern staes; 5-15% in the southern states. ***VFR:** 80-95% of winter in the western states. 70-90% elsewhere, except for Great Lakes area (65-80%).
SOUTHEAST: Tenn., Eastern La., Miss., Fla., Ala., Ga., N.C., S.C.	Coastal plains and part of the Appalachian highlands.	**Wind:** fairly strong, westerly winds predominate during winter. **Precipitation:** average number of days ranges from 7-11, predominantly rain.	**Aircraft Icing:** occurs from 0-10% during the wintertime. ***VFR:** 90% of the time over most of the region; 80-85% in Tenn.
NORTHEAST: Ky., Ohio, N.Y., Va., West Va., Vt., N.H., Mass., R.I., Conn., N.J., Del., Md., Me., Penna.	Coastal lowlands bordered on the west by Appalachian mountains.	**Wind:** westerly; mountain & valley winds exceed 25 mph from 5-15% of winter. **Precipitation:** averages 11-14 days per month except for lee side of Great Lakes (16-18 days).	**Aircraft Icing:** occurs 5-30% of winter; greatest frequency in Great Lakes area. ***VFR:** 75-80% over most of region; 60-75% on the lee side of the Great Lakes.

* Ceiling 1,000 ft. or higher; visibility 3 miles or better.

What Have You Got to Lose?

Skill Retention for Non-Commercial Pilots

If you had an opportunity to get into a flight insurance program that reduces the likelihood of the average general aviation pilot becoming involved in an accident by three or four fold, would you be willing to pay $50 to $100 a year for the privilege? *Sure? No? Maybe?*

Your answer would probably depend upon how much you value your life, and how much you believe in statistics. Figures from the National Transportation Safety Board show that of the 740,000 certificated pilots, some 3,000 had an accident in the past year, and about 600 of these accidents were fatal. That works out to approximately one accident for every 247 pilots; and about one *fatal* accident per every 1,230 pilots per year—a reasonably good percentage, but not one that gives you a sense of invulnerability.

However, within the general aviation population there is a "preferred risk" group whose likelihood of being involved in an accident is much lower than the overall rate: about one accident for every 450 pilots. What is more, the *fatal accident rate for pilots in this special "WINGS" group is a remarkable one-fourth of the overall rate.*

"WINGS" is a popular term for the "Pilot Proficiency Award Program," initiated in 1977 by FAA for the benefit of general aviation pilots who recognize a need for assistance in retaining their operating skills at an optimum level. Such recognition is a key in the flying careers of pilots whose competence is not supported by mandatory recurrency training programs, such as those required for air carrier and air taxi pilots.

Some pilots find it difficult to believe that human learning, once acquired, is not stored permanently in the mind—as is possible with computers. But the fact is that human *intelligence retention is selective*: we retain both skills and knowledge in proportion to their use and apparent importance to our survival. The process of forgetting can begin almost the moment we walk off the airfield with a newly acquired certificate or rating in hand. This is certainly true for general aviation pilots who may fly infrequently and irregularly, in between work and family demands on their time—i.e., those who fly for pleasure or recreation, or for occasional business convenience.

Some understanding of how rapidly the flight skills of pilots can erode has been gained as a result of a study conducted at FAA's Technical Center in Atlantic City, NJ. The study was designed to track the retention or loss of pilot skills over a 24 month period following certification as a private pilot; and to observe the effect of additional training on retention of the initial skill level. A secondary objective was to learn how accurate recently certificated private pilots were in predicting their ability to carry out basic flying tasks and in evaluating their actual performance.

The group of pilots studied consisted of 42 subjects, with an average age of 25. At intervals of 8, 16, and 24 months they were individually tested and rated on their performance of 29 basic flight tasks. To broaden the study, some of the pilot subjects were given additional training towards an instrument and multi-engine rating, in the intervals between flight checks.

The pilot subjects were all told in advance exactly which tasks they would be tested on. They were also invited to predict how well they thought they would do on each task, and to comment later on their performance. During the 24 months of the study the pilots as a group average about three hours of flying per month. However, those who received no advanced training flew less than one hour a month.

In scoring the subjects' performance on the 29 basic flight tasks, the investigators used as a base line the scores recorded during their private pilot testing on these same tasks. Over the 24 month test period the group as a whole averaged a *33 percent increase in flight task errors.* Pilots who had performed at least nine out of ten flight tasks correctly during their initial testing now completed only six out of ten tasks correctly, on the average. (Their written test scores also dropped by about 16 percent.)

The study concluded that **recently certificated** pilots who do not fly *regularly undergo a rapid and significant deterioration of their ability to perform flight tasks.*

No definition of what it is to "fly regularly" was attempted. For example, Government pi-

JOINING THE WINGS GROUP

To participate in the Pilot Proficiency Award Program, contact your local certificated flight instructor, an FAA-appointed accident prevention counselor, or your local Flight Standards/General Aviation District Office. As a certificated pilot you should be on their mailing list for notices of local meetings. You may also ask them to send you FAA Advisory Circular 61-91D, which describes the program.

Note that some insurance companies are now recognizing the value of the "WINGS" program in reducing pilot error as an accident cause, and may offer favorable consideration to those who complete the training. Such information should be included in your insurance application form. The dollars you could save might underwrite additional training.

lots are usually required to fly at least an average of four hours a month to remain current, but this may not be enough for low-time, non-professional private pilots whose day-to-day activities are otherwise oriented. Some of the pilots in the study logged as many as six or more hours a month in the first eight months, including instrument and multi-engine training, yet committed nearly as many errors in the test at the end of the period as other pilots who flew less than one hour per month and received no advanced training.

The study observed that instrument training was more effective than multi-engine training in reducing skill erosion, but the effects were temporary in any case. (See Figures 1 and 2) Not only recently certificated pilots, but the majority of the general aviation pilot population was considered susceptible to rapid skill erosion—i.e., "forgetting"—in the absence of some form of continuation training.

The self-prediction and self-evaluation forms completed by the subject pilots largely failed to conform to the errors in their actual flight task performance. In other words, their assumed level of competence was much higher than their demonstrated performance.

In this connection the FAA-required Biennial Flight Review serves an important purpose in calling attention to unsuspected skill weaknesses in the cockpit. However, the responsibility for taking appropriate remedial actions, following the completion of a BFR, rests with the individual. Many pilots apparently assume that they can improve their skills by resolve alone, rather than by means of scheduled practice or training—which is illusory.

Skill retention or loss in flying is generally divided into two kinds: cognitive/procedural and control oriented—or, more simply put, mental versus manual tasks. The present study confirmed the widely held belief that the most serious skill loss is in the mental area.

Some examples:

- **All** subjects failed to acknowledge at least one ATC message.
- **Almost all** (95%) of the subjects used improper control positions while taxiing.
- **Most** (83%) of the subjects were unable to radio transmit the required information for an inflight change in flight plan.
- **Most** (83%) of the subjects failed to identify a tracking station.
- **More than half** of the pilots failed to put in carburetor heat during a simulated engine failure in flight.
- **Nearly half** of the pilots failed to recognize stall conditions when they developed in flight.
- **Many** subjects made an incorrect entry to the traffic pattern during an approach to land at an uncontrolled airport.

Note that these errors did not necessarily constitute an unsafe flight condition, insofar

FIGURE 1— MEAN FLIGHT TIMES OF THE GROUPS BY 8-MONTH RETENTION INTERVAL

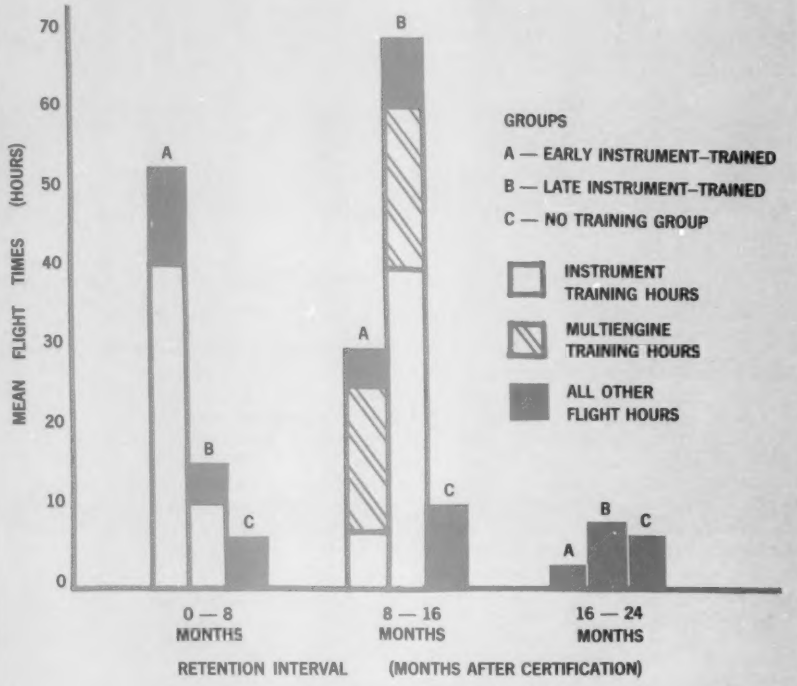
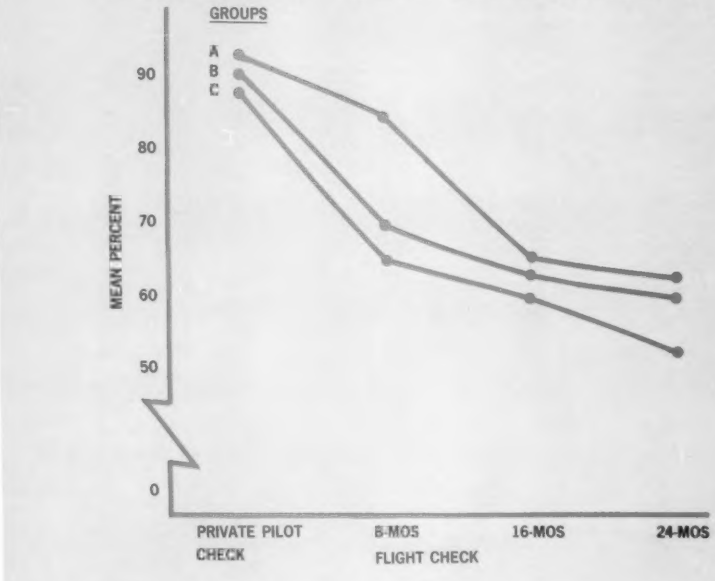


FIGURE 2 —MEAN PERCENT OF CORRECTLY PERFORMED MEASURES BY GROUPS



as the pilots were able to complete the maneuver without incident, but there was clear evidence that flight skills had eroded since certification, and presumably would continue to erode given the present pattern of flight activity.

The flight tasks which in this study showed the greatest and least degree of skill loss during the 24-month test period are shown in Figure 3. Note that those with minimal skill loss are primary control-oriented, with sources of immediate feedback.

Ideally, skill retention is best reinforced with continued flight practice, training, and testing. Good results may also be expected, the study concluded, when flight experience is supplemented with simulator training and testing, which can be accomplished with considerable savings in time and money for the pilot.

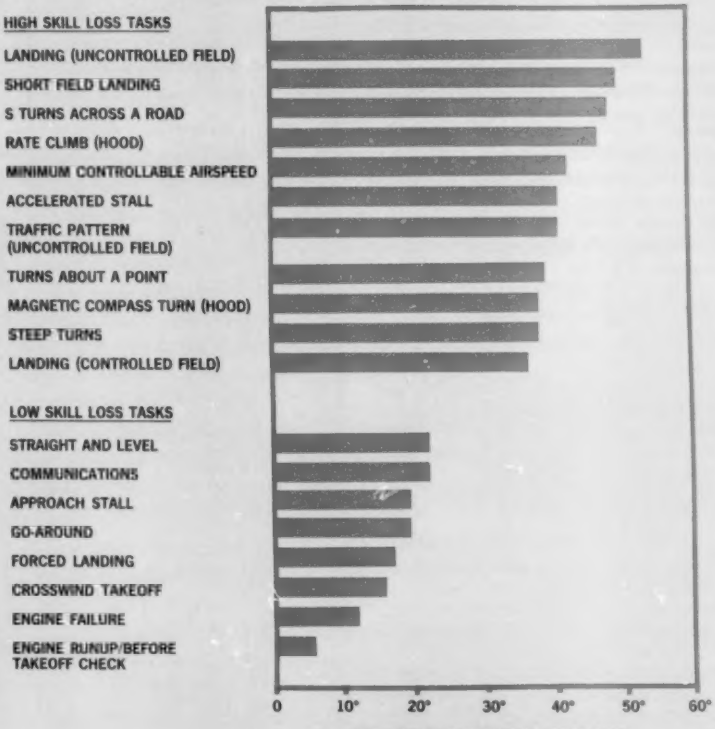
Simulators which provide what is known as "full mission simulation" are best if accessible, since they provide the most realistic substitute for cockpit experience. Virtually any type of audio/visual accompaniment is helpful, insofar as it places realistic demands on the pilot's attention while manipulating controls. So called-"table-top" simulators, while less effective for skill retention, nevertheless have some value. Likewise helpful are any type of simulated cockpit environment which a pilot can construct for himself at home, including photos of panel instruments, airport environments, weather conditions, etc. These enable us to rehearse flight procedures in spare moments with the aid of checklists provided in operator's handbooks.

In view of the success of "WINGS," the Pilot Proficiency Award Program, in reducing accidents, it appears that the kind and amount of continuation training undertaken may not be the only determining factors. To qualify for the Pilot Proficiency Award, a pilot need only complete three hours of a prescribed flight review with a certificated instructor within a period of 120 days. The special mini-refresher course is tailored to the type of aircraft selected by the pilot (airplanes, rotorcraft, gliders and balloons). The airplane course includes one hour of instrument training, which may be taken in a simulator. There are no other required activities, apart from attendance at one pilot clinic, seminar, or safety meeting approved by the local FAA Flight Standards field office. In fact, in some cases one of the training hours may also satisfy the requirement for the Biennial Flight Review, or to regain instrument currency.

It is hard to see how such minimal requirements are able to bring about such a marked improvement in pilots' ability to fly safely, as indicated by the accident record mentioned earlier, but somehow it does. Perhaps a key element lies in the pilot's recognition of the fact that he cannot hold onto his recently acquired skills by determination alone, or by building up "time" without supervision. Perhaps the exchange of personal anecdotes at the safety meetings has some shock effect. Discovering that you are not the only pilot who has had some really bad, anxious moments in the cockpit, as a result of vanity or over-estimating your ability, can be a refreshing experience-especially when listening to the "confessions" of celebrity/pilots like Cliff Robertson or John Denver. You can also get a new perspective on your responsibilities for preserving the safety and freedom of our airspace. ■

John Denver is shown mingling with pilots at a Scottsdale, Arizona meeting.

FIGURE 3— FLIGHT TASK EXHIBITING GREATEST AND LEAST 24-MONTH SKILL LOSS



BY THE RULE

STATUS OF THE FEDERAL AVIATION REGULATIONS

The Federal Aviation Regulations (FARs) are like any other publication. Some make it to the best seller list, like Part 43 ("Maintenance, Preventive Maintenance, Rebuilding and Alteration"), Part 61 ("Certification: Pilots and Flight Instructors"), and Part 91 ("General Operating and Flight Rules"), while others sit on the shelves collecting dust.

Some of the slow movers are on subjects of limited interest, such as Part 151 ("Federal Aid to Airports"), but others may be overlooked by pilots because they are unaware of their existence. For example, Part 189, "Use of the Federal Aviation Administration Communications Systems," explains the types of messages approved for transmission over the FAA communication system and what types could have a possible charge attached to them.

Another little read item is Part 99, whose title, "Security Control of Air Traffic," does not have any popular connotations. However, if you do any flying over coastal areas and you have no wish to find yourself being inspected at close range by a heavily armed Air Force jet, you might find the few dollars it costs a reasonable price.

Many popular FARs are reprinted commercially, some in book form. It is important to keep in mind that the rules are amended often (in some cases), and existing provisions may be nullified or changed by this process unless they are updated continuously.

The FARs are sold in two ways by the Superintendent of Documents on *subscription* and by *single sales*. When you order a subscription, for which there is an annual charge, the changes will be sent to you automatically as they are issued. Single sales are a different matter. The changes to these parts are infrequent, and no direct notice of a change is sent out. Therefore you must order and pay for each change as it is issued. The following pages contain the current status and price list for the FARs. Color hi-lighting indicates those rules considered of special interest to general aviation pilots.

They can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Parts Sold on Subscription Service

Part	Title	ID Code Letters	Price: Domestic	Price: Additional for Foreign Handling	Price: Changes Issued To Date
1	Definitions and Abbreviations	FA001	$14.00	$3.50	8
11	General Rule-Making Procedures	FA011	25.00	6.25	16
13	Investigation and Enforcement Procedures	FA013	34.00	8.50	7
21	Certification Procedures for Products and Parts	FA021	60.00	15.00	24
23	Airworthiness Standards: Normal, Utility, and Acrobatic Category Airplanes	FA023	28.00	7.00	18
25	Airworthiness Standards: Transport Category Airplanes	FA025	40.00	10.00	18
27	Airworthiness Standards: Normal Category Rotorcraft	FA027	40.00	10.00	15
29	Airworthiness Standards: Transport Category Rotorcraft	FA029	29.00	7.25	17
36	Noise Standards: Aircraft Type and Airworthiness Certification	FA036	36.00	9.00	16
45	Indentification and Registration Marking	FA045	30.00	7.50	11
61	Certification: Pilots and Flight Instructors	FA061	40.00	10.00	11
63	Certification: Flight Crewmembers Other Than Pilots	FA063	33.00	8.25	6
91	General Operating and Flight Rules	FA091	38.00	9.50	59
93	Special Air Traffic Rules and Airport Traffic Patterns	FA093	33.00	8.25	13
103	Ultralight Vehicles	FA103	32.00	8.00	1
108	Airplane Operator Security	FA108	13.00	3.25	
121	Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft	FA121	35.00	8.75	48
125	Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More	FA125	17.00	4.25	4
127	Certification and Operations of Scheduled Air Carriers With Helicopters	FA127	32.00	8.00	13
135	Air Taxi Operators and Commercial Operators	FA135	30.00	7.50	14
139	Certification and Operations: Land Airports Serving CAB-Certificated Air Carriers	FA139	14.00	3.50	7
150	Airport Noise Compatibility Planning	FA150	24.00	6.00	
152	Airport Aid Program	FA152	31.00	7.75	12
159	National Capital Airports	FA159	30.00	7.50	11

(continued on next page)

Parts Sold On Single-Sale Basis

Part	Title	Price [1]
31	Airworthiness Standards: Manned Free Balloons SN 050-007-00246-7	2.25
	Change 1 SN 050-007-00361-7	1.75
	Change 2 SN 050-007-00559-8	4.50
35	Airworthiness Standards: Propellers SN 050-007-00247-5	2.75
	Change 1 SN 050-007-00363-3	3.25
	Change 2 SN 050-007-00369-2	3.00
	Change 3 SN 050-007-00558-0	4.50
39	Airworthiness Directives [2] SN 050-007-00229-7	1.75
43	Maintenance, Preventive Maintenance, Rebuilding and Alteration SN 050-007-00311-1	4.50
	Change 1 SN 050-007-00430-3	3.00
	Change 2 SN 050-007-00560-1	4.50
	Change 3 SN 050-007-00564-4	2.25
	Change 4 SN 050-007-00582-2	2.25
	Change 5 SN 050-007-00624-1	3.75
	Change 6 SN 050-007-00673-0	1.50
47	Aircraft Registration SN 050-007-00312-9	4.50
	Change 1 SN 050-007-00335-8	1.75
	Change 2 SN 050-007-00422-2	1.75
	Change 3 SN 050-007-00457-5	1.75
	Change 4 SN 050-007-00507-5	3.25
	Change 5 SN 050-007-00521-1	1.75
	Change 6 SN 050-007-00603-9	1.75
49	Recording of Aircraft Titles and Security Documents SN 050-007-00232-7	1.75
	Change 1 SN 050-007-00336-6	2.00
65	Certification: Airmen Other Than Flight Crewmembers SN 050-007-00314-5	4.75
	Change 1 SN 050-007-00399-4	2.00
	Change 2 SN 050-007-00433-8	1.75
	Change 3 SN 050-007-00489-3	1.75
	Change 4 SN 050-007-00518-1	1.75
	Change 5 SN 050-007-00524-5	1.75
	Change 6 SN 050-007-00539-8	3.00
	Change 7 SN 050-007-00604-7	2.25
	Change 8 SN 050-007-00616-1	2.75
67	Medical Standards and Certification SN 050-007-00248-3	3.50
	Change 1 SN 050-007-00341-2	1.75
	Change 2 SN 050-007-00611-0	4.50
	Change 3 SN 050-007-00617-9	2.75
71	Designation of Federal Airways, Area Low Routes, Controlled Airspace, and Reporting Points [3] SN 050-007-00273-4	3.75
	Change 1 SN 050-007-00290-4	2.00
	Change 2 SN 050-007-00662-4	1.25
73	Special Use Airspace [3] SN 050-007-00274-2	1.75
	Change 1 SN 050-007-00291-2	2.00
	Change 2 SN 050-007-00402-8	1.75
75	Establishment of Jet Routes and Area High Routes [3] SN 050-007-00275-1	2.75
	Change 1 SN 050-007-00326-9	2.00
77	Objects Affecting Navigable Airspace SN 050-007-00276-9	4.50
95	IFR Altitudes [3] SN 050-007-00277-7	1.75
	Change 1 SN 050-007-00285-8	1.75
97	Standard Instrument Approach Procedures [4] SN 050-007-00278-5	3.00
	Change 1 SN 050-007-00471-1	1.75
99	Security Control of Air Traffic SN 050-007-00224-6	3.50
	Change 1 SN 050-007-00324-2	1.75
	Change 2 SN 050-007-00591-1	2.25
	Change 3 SN 050-007-00606-3	1.75
101	Moored Balloons, Kites, Unmanned Rockets, and Unmanned Free Balloons SN 050-007-00223-8	1.75
	Change 1 SN 050-007-00242-4	1.75
105	Parachute Jumping SN 050-007-00315-3	3.25
	Change 1 SN 050-007-00344-7	1.75
	Change 2 SN 050-007-00431-1	3.00
	Change 3 SN 050-007-00563-2	1.25
107	Airport Security SN 050-007-00468-1	3.50
	Change 1 SN 050-007-00588-1	2.50
	Change 2 SN 050-007-00607-1	2.25
109	Indirect Air Carrier Security SN 050-007-00512-1	1.75
129	Operations of Foreign Air Carriers SN 050-007-00228-9	1.75
	Change 1 SN 050-007-00293-9	2.25
	Change 2 SN 050-007-00333-1	1.75
	Change 3 SN 050-007-00347-1	1.75
	Change 4 SN 050-007-00429-0	1.75
	Change 5 SN 050-007-00439-7	1.75
	Change 6 SN 050-007-00491-5	1.75
	Change 7 SN 050-007-00589-0	2.50
	Change 8 SN 050-007-00608-0	2.25
133	Rotorcraft External-Load Operations SN 050-007-00318-8	1.75
	Change 1 SN 050-007-00365-0	3.50
	Change 2 SN 050-007-00380-3	2.00
	Change 3 SN 050-007-00389-7	1.75
	Change 4 SN 050-007-00450-8	1.75
137	Agricultural Aircraft Operations SN 050-007-00258-1	3.25
	Change 1 SN 050-007-00327-7	1.75
	Change 2 SN 050-007-00337-4	1.75
	Change 3 SN 050-007-00435-4	2.25
	Change 4 SN 050-007-00440-1	1.75
	Change 5 SN 050-007-00451-6	1.75
	Change 6 SN 050-007-00494-0	1.75
	Change 7 SN 050-007-00537-7	1.75
141	Pilot Schools SN 050-007-00322-6	3.50
	Change 1 SN 050-007-00620-9	2.25
143	Ground Instructors SN 050-007-00249-1	3.00
145	Repair Stations SN 050-007-00220-3	4.50
	Change 1 SN 050-007-00349-8	2.75
	Change 2 SN 050-007-00424-9	2.25
	Change 3 SN 050-007-00436-2	2.25
	Change 4 SN 050-007-00511-3	1.75
	Change 5 SN 050-007-00563-6	1.75
	Change 6 SN 050-007-00583-1	1.75
	Change 7 SN 050-007-00599-7	1.75
	Change 8 SN 050-007-00615-2	2.25
	Change 9 SN 050-007-00674-8	1.00
147	Aviation Maintenance Technician Schools SN 050-007-00250-5	3.50
	Change 1 SN 050-007-00350-1	2.25
	Change 2 SN 050-007-00437-1	2.25
149	Parachute Lofts SN 050-007-00221-1	1.75
151	Federal Aid to Airports SN 050-007-00261-1	5.00
153	Acquisition of U.S. Land for Public Airports SN 050-007-00262-9	1.75
155	Release of Airport Property from Surplus Property Disposal Restrictions SN 050-007-00270-0	1.75
	Change 1 SN 050-007-00550-4	1.75
157	Notice of Construction, Alteration, Activation, and Deactivation of Airports SN 050-007-00279-3	2.75
169	Expenditure of Federal Funds for Nonmilitary Airports or Air Navigation Facilities Thereon SN 050-007-00280-7	2.25
171	Non-Federal Navigation Facilities SN 050-007-00281-5	4.50
	Change 1 SN 050-007-00297-1	3.75
	Change 2 SN 050-007-00619-5	5.00
183	Representatives of the Administrator SN 050-007-00233-5	3.00
	Change 1 SN 050-007-00352-8	1.75
	Change 2 SN 050-007-00398-6	1.75
	Change 3 SN 050-007-00503-2	1.75
	Change 4 SN 050-007-00527-0	1.75
	Change 5 SN 050-007-00634-9	3.50
187	Fees SN 050-007-00234-3	2.75
	Change 1 SN 050-007-00618-7	2.75
189	Use of Federal Aviation Administration Communication System SN 050-007-00235-1	2.75
191	Withholding Security Information From Disclosure Under the Air Transportation Security Act of 1974 SN 050-007-00359-5	1.75
	Change 1 SN 050-007-00502-4	1.75

[1] Add 25% for foreign handling.

[2] Due to their length, complexity, and frequency of issuance, individual Airworthiness Directives are published separately in the Federal Register. Copies of Airworthiness Directives that have been issued are for sale in summary form by DOT/FAA, the consigned agent for the Superintendent of Documents. Order from: DOT/FAA, Aeronautical Center, Attn: AAC-23, P.O. Box 25461, Oklahoma City, Okla. 73125. (Vol. I–AD's for Small Aircraft is $85.00 plus $21.25 additional for foreign handling. Vol. II–AD's for Large Aircraft is $80.00 plus $20.00 additional for foreign handling.)

[3] Due to their length, complexity, and frequency of issuance, individual airspace designations, airways descriptions, restricted areas, jet route descriptions, and IFR altitudes are not included in the publication of these basic Parts. Such descriptions are published in the Federal Register and depicted on appropriate aeronautical charts. Aeronautical charts can be obtained from the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Distribution Branch (N/CG33), Riverdale, Maryland 20737.

[4] Standard Instrument Approach Procedures are published in the Federal Register by reference to FAA documents which are available for examination in the Rules Docket (AGC-24) and the National Flight Data Center, FAA Headquarters, Washington, D.C. and at the appropriate FAA Regional Offices and Flight Inspection District Offices. These Instrument Approach Procedures Charts can be obtained from the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Distribution Branch (N/CG33), Riverdale, Maryland 20737.

The First Skydivers

When you see a stream of skydivers jumping out of a perfectly sound airplane, have you ever wondered how and where it all began?

Legend has it that the first "sport chutist" was the Chinese Emperor Shih Huang Ti, who in the second century B.C. nimbly leaped down from the recently completed Great Wall with the aid of a large silk parasol. How he got the idea is not recorded, but by the time Marco Polo reached the Far East in the 13th Century A.D., the use of parasols by acrobats to cushion long falls was commonplace.

The first scientific mind to consider this phenomenon belonged—as might be expected—to Leonardo da Vinci, who in the 16th Century designed a "tent roof of calked linen twelve yards broad and as many high," that would allow a man to "fall from a grete [sic] height without injury to himself."

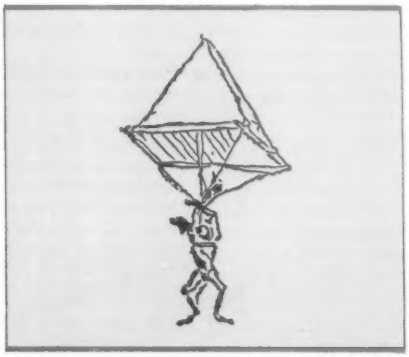
No production model was ever made, and the concept lay buried within the pages of Leonardo's notebooks for several hundred years. In the meantime the Oriental parasol had metamorphosed into the European umbrella, and the fact that a lightweight but rigid, hemispheric-shaped implement could almost tug a man off of his feet in gusty air did not pass unnoticed.

Still no one bothered to invent the parachute because no one really saw any purpose in it. But when the era of manned balloon flight was ushered in, toward the end of the 18th Century, the stage was set for the most exciting stunt entertainment the world had ever known—all made possible by means of a few dozen yards of rolled-up cloth.

Surprisingly, the widespread use of manned balloons did not stimulate the development of an escape vehicle. True, fashionable balloon travelers sometimes found it amusing, in the name of science, to push household pets—usually small cats or dogs—out of the gondolas they were riding in, supported by a makeshift parachute.

This usually consisted of a silk scarf with strings from the four corners tied to the animal's collar. Some of the poor creatures survived and some did not, but few of them enjoyed the ride. Various individuals suggested umbrella-type chutes for human use, but the problems of deploying one large enough to bear a person's weight seemed insurmountable.

Enter on the scene one Andre-Jacques Garnerin, of France. On October 22, 1797 he appeared alone over Paris, at an altitude of one and one-quarter miles, standing in the gondola of a large hot-air balloon. After a dipping a flag, to catch the attention of spectators in the park below, he cut away a line, which instantly freed the balloon. A hushed silence came over the crowd, then screams of horror as the gondola plummeted toward earth. Suddenly a great expanse of white canvas attached to the car mushroomed out in the sky and bore Garnerin to the ground at a relatively gentle pace. The first semi-foldable, man-carrying parachute had been invented.



First parachute design, by Da Vinci, circa 1500 A.D.

Garnerin's chute—still the basic model for contemporary designs—consisted of 23 "gores," triangular pieces of canvas sewed together and fastened at the crown to a small wooden hoop, which in turn had been fastened to the balloon netting. Linear rigidity was supplied by a central pole, secured to the gondola, while an ingenious arrangement of lines contained the canvas folds prior to the static release, at which point the chute blossomed open to a diameter of 23 feet.

A jubilant Garnerin proclaimed his invention a complete success, but in fact his descent had been characterized by wild swings and oscillations, and on landing he had been thrown from the car in a nauseous and fainting condition. After a brief repite, however, he was able to mount a horse and be paraded around the park to the great acclaim of the throng. Later, by installing a vent at the top of his chute he was able to overcome its instability.

Garnerin took his one-man show to the capitals of Europe, where enormous crowds gaped and shuddered and cheered. For some demonstrations two gondolas were used, one for the chutist and one which remained attached to the balloon, which could then be salvaged. Variations of the original chute were made by other stunt "flyers." Some were seen leaping out of their gondola grasping a trapeze bar and opening the chute with the force of their weight alone. Others descended clasping the trapeze with their legs, or with one leg only, or with their chin.

This new form of entertainment, with the broad sky for its stage, attracted an international army of performers. For a standard fee of about ten dollars a dive, they would "go anywhere, jump any way." In United States, county and state fairs provided ideal outdoor arenas.

The manned balloon became more of a jumping station than a possible form of travel, and the commercial success of the sport allowed the life-saving potential of the parachute to lie dormant for over a hundred years. Even the invention of the airplane in 1903 by the Wright Brothers did little more than provide the stunters with a new platform. Eventually it took the drums of war to open people's eyes to a ready means of avoiding needless loss of life.

(A second article in this series will appear in the next issue.) ■

CARVED TO ORDER. The small town of Grundy, VA might still be without its airport (above) if a coal mining company had not created a "high wall" along one of the countless ridges in the southern Allegheny Mountains. The wall was levelled and the 2,400-foot runway built with funds from FAA's Airport Development and Aid Program.

CHECKLIST HELPS AIRMEN WITH AMATEUR PLANE BUILDING

After a successful one-year trial, FAA has adopted the use of checklists for determining whether a "home built" aircraft involved enough owner construction for the end result to qualify for experimental certification as amateur-built.

To qualify for an experimental certificate, an amateur-built aircraft must have had more than 50% of its fabrication and assembly accomplished by the builder. If not, the aircraft is only eligible for an experimental certification for "Exhibition," which limits the operation to demonstrations of flight characteristics at air shows or similar events and to flying to and from the exhibitions.

The checklists provide a list of basic tools and functions needed to produce a complete aircraft. An FAA inspector and the builder check off the tools used and the functions performed, and the percentage of owner construction is then automatically calculated.

The checklists are available for builder review at the airworthiness branches of FAA Flight Standards or General Aviation district offices.

BALLOON RULES REVIEWED

FAA has begun a regulatory review of FAR Part 101 (Moored Balloons, Kites, Unmanned Rockets, and Unmanned Free Balloons) and is encouraging the public and the aviation industry to participate by submitting comments or proposals for agency consideration.

Areas where regulations are most likely to be changed include revising Part 101 (and subsequently Part 91) to clarify the specific requirements for the operation of manned and unmanned moored balloons (See May/June 1984 FAA GENERAL AVIATION NEWS) and revising Part 91 to include additional provisions for the operation of moored balloons. FAA is particularly interested in whether regulations should require moored balloons to display anticollision lights or high visibility flags on the mooring lines.

Other areas of Part 101 where rule changes are being considered concern unmanned rockets (Should they be allowed to operate in controlled airspace?) and remotely piloted vehicles (Should regulations allow them to operate in other than special use airspace?).

Proposals or comments should be sent to the Rules Docket, AGC-24, Office of the Chief Counsel, FAA, 800 Independence Ave., S.W., Washington, D.C. 20591. Questions may be directed to Mr. Brent Fernald, ATO-230, 800 Independence Ave., S.W., Washington, D.C. 20591.

ULTRALIGHT MISHAP INVESTIGATIONS

After investigating 167 ultralight accidents over a 19-month period, the National Transportation Safety Board has ceased this activity and will issue a special study on its findings in early 1985. NTSB will continue to investigate ultralight accidents involving significant safety issues or where the public safety may have been endangered.

FAA Flight Standards district offices will investigate accidents involving an ultralight collision with a certificated aircraft, or a violation of Part 103. FAA will collect information about—but not formally investigate—ultralight fatal accidents where there is no violation of FAR's and will initiate enforcement proceedings for non-fatal accidents where a violation is suspected. Ultralight industry groups will most likely continue their informal accident inquiries as well.

LATEST AIRMAN PUBLICATIONS

Chart Catalog

The 1984-1985 "Catalog of Aeronautical Charts and Related Publications" is now available free from NOAA Distribution Branch, N/CG33, National Ocean Service, Riverdale, MD, 20737. The general information telephone number is (301) 436-6990. Current chart prices and subscription rates may also be obtained at the above address.

Near Mid-Air Study

A limited number of free individual copies of a recent FAA statistical study of near midair collisions is available from the FAA Office of Public Affairs, APA-300, 800 Independence Ave., S.W., Washington, D.C. 20591; (202) 426-8521.

NDB Frequency Congestion

FAA has issued a free advisory circular which recommends several actions pilots and aircraft owners can take to help alleviate frequency congestion in the 190-535 kHz range—the range for nondirectional beacons used in Automatic Direction Finder (ADF) navigation. Among the actions suggested are the purchase of ADF units with the capability of tuning to .5 kHz increments. Free from DOT Distribution Unit, M-494.3, Washington, D.C. 20590.

Publications Guide

The latest guide to all FAA publications which also indicates current prices and addresses and telephone numbers for all 26 Government Printing Office bookstores is now available. "Guide to FAA Publications (FAA-APA-PG-7)" is free from M-494.3, address above.

Composite Compliance

Guidelines for showing compliance with appropriate FAR's regarding airworthiness certification, quality control, and repairs for composite aircraft structures may be found in AC 20-107 "Composite Aircraft Structure." Free from M-494.3, address above.

RNAV Random Routes

RNAV users whose equipment has longitude/latitude coordinate navigation capability will be interested in AC 90-82, "Random Area Navigation Routes." The coordinate capability aids in better air traffic flight plan tracking. Free from M-494.3, address above.

SHOULDER HARNESS PROMOTION

FAA and the aviation industry have begun a promotion to encourage general aviation pilots and passengers to use shoulder harnesses along with their seat belts to help reduce crash impact and inflight turbulence injuries. A colorful poster which illustrates harness use for persons and baggage is available free from the Aircraft Owners and Pilots Association (421 Aviation Way, Frederick, MD 21707) or the General Aviation Manufacturers Association (1400 K St., N.W., Suite 801, Washington, D.C. 20005).

• Minimum Compression

I cannot find the actual requirements for a compression minimum test on aircraft engines in the FARs.

There is a wide difference of opinion among aircraft mechanics of the minimum compression before they can approve the engine for return to service after testing while doing an "annual."

I realize good judgement calls for something reasonable, but I still wonder just what the requirements are.

E.W. Beningfield
Raytown, MO

Engine manufacturers are required to publish a maintenance manual for each engine which gives the acceptable differential pressure between each cylinder, at a given temperature . (This data is not found in the FARs.) For example, the manual for Lycoming engines indicates that "pressure readings for all cylinders should be nearly equal. A difference of 5 psi is satisfactory; a difference of 10 to 15 psi indicates an investigation should be made."

• Water Traps and Absorbers

In the March/April 1984 issue there was an article entitled "Fuel Tanks as Water Traps." I have been flying since 1968. Most of my time is in a Cessna 172 (rental). Presently I am renting a Beech Sundowner *180. Is it reasonable to assume that since the planes are rented, and used extensively, the chances of trapped water are very small? During any of my normal preflight inspections I have never detected any water. Please advise if my thinking is correct or not.*

How does the FAA react to the use of water absorbing chemicals in the fuel—if there are any available?

Kurt J. Weimer
Excelsior, MN

The *Sundowner* 180 is not designed for flexible bladder tanks and, therefore, would not be likely to trap **undetectable** water. The fact that an aircraft is used for rental does not in itself assure that this problem could not occur, if it is of the make and model described in our article on "Water Traps."

If you have occasion to rent such an aircraft, you may inquire as to whether its fuel tanks have been serviced in accordance with the latest manufacturer's service letter on this subject.

Water-absorbing agents for general aviation fuel systems have been approved by certain aircraft manufacturers. Check with the manufacturer of the aircraft in question. For some models there is a concern that the absorbing agent may cause disintegration of parts within the fuel intake system.

• Short Tether

While reading the FAA GENERAL AVIATION NEWS of May/June, I have found an area on ballooning that is still not clear to me. Reference the tabular comparisons relating to tethered balloons under the heading, "Altitude flown," on page 13.

It states that above 150' AGL the balloon must be marked by pennants, streamers, or lights. My question is: If a balloon is operated on a tether at night below 150' AGL, are position lights required?

This area appears to be vague in our ballooning community. Would you please elaborate more on the lighting of tethered balloons at night?

Thomas Anderson
Phoenix, AZ

A tethered balloon is governed by Part 91.73 which simply requires lighted position lights and anti-collision light at night. However, the requirements for a moored balloon (Part 101.17) at night are also acceptable—i.e., lighting on the balloon and its lines that provide a visual warning equal to that required for obstructions to air navigation.

• Trying It On For Size

The FAA probably goes to extra trouble and expense to publish its FAA GENERAL AVIATION NEWS on non-standard sized paper. However, this company is one subscriber which clips and preserves articles for future use in business and personal activities. It seems certain that FAA would want subscribers to preserve and act upon their safety data. However, the non-standard sized paper forces the user to trim each sheet for filing in standard-size files.

For those who do preserve and sort the data, it would be most helpful if standard 8½ × 11 paper were used. What action would be required to get FAA to adopt that standard for this publication? Your response will be most appreciated.

Stephen Chris
Gaithersburg, MD

The 9" width used for this publication is not really unusual, nor a cause of any additional expense. We believe it enables us to present a maximum amount of information within the number of pages to which we are limited (normally 16 pages, with occasional "bonus" issues of 20 or 24 pages).

However, we are not inflexible on this subject. We would like to hear the opinions of other readers before making a decision.

Thank you for your suggestion.

• Foreign Eligibility

Could you clarify one aspect of your reply to a letter published in the May/June issue? This is in regard to the question of requirements for the holder of a non-U.S. Commercial Pilot Certificate to obtain an unrestricted U.S. Commercial Certificate.

Your reply included a statement that; "Previous flight experience may be applied toward the flight time requirements." However I was wondering if the requirement of FAR 61.129 (b)(2)(ii)—requiring 10 hours of instruction in preparation for the flight test—must be by an instructor holding a current U.S. Flight Instructor Certificate? How about instruction for the Instrument Rating?

There seems to be adequate justification to require this in order to indoctrinate the applicant into the U.S. airspace and ATC systems.

Name withheld

Affirmative to both questions. The instruction you refer to must have been given by the holder of an appropriate U.S. Instructor's Certificate. Thank you for helping us make this clarification.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFO-807, Washington, D.C. 20591.

• Runway Heading, Round Four

Are you actually agreeing with the statement of John Reynolds on the letters page in the July/August issue ("Same Subject, Part III") that when directed by ATC to fly the runway heading the pilot should fly the compass heading indicated when the aircraft is aligned with the runway centerline?

J. Shea
Great Falls, VA

No. We basically agreed on the discrepancies that may exist between the runway number and the actual magnetic heading of the runway. Unfortunately the conclusion of our reply was inadvertently waylaid en route to the printshop. It read as follows:

"However, for purposes of air traffic control, when directed to 'fly/maintain runway,' pilots are expected to comply with the ATC clearance by FLYING THE HEADING INDICATED BY THE RUNWAY NUMBER without applying any correction for drift. If the number painted on the runway is 4, fly magnetic heading 040°."

• Guarding the Air

While serving in the military, I got into the habit of always "guarding" 121.5 when I was not doing anything else with my radio. As a civilian private pilot, this still seems to be a reasonable idea from the standpoint of being able to listen for ELT's or distress calls while flying in remote locations. On the other hand, current weather and area broadcasts from FSS's are not available on this frequency. Does the FAA recommend any particular "guard" practice for single-radio civil aircraft, and if so, why?

Bennett Taber
Anchorage, AK

With a single com-radio only, you would normally tune in to available air traffic facilities, for traffic, latest weather and other advisories. If you have two com-radios capable of simultaneous reception, there is no reason not to continue guarding 121.5.

INSTRUMENT CORNER

• Instrument X-Country

The term "cross-country" is fairly well-defined with respect to the Private Pilot certificate (50 nautical miles). However, no such clarity exists in FAR Part 61.65 (e) (flight experience) which requires "50 hours . . . cross-country in a powered aircraft." Do these "cross-country flights" have to be 50 nautical miles?

Jerry D. Spingarn
Norwood, MA

Affirmative. The 200 hours of pilot flight time required for the instrument rating must include 50 hours of cross-country in a powered aircraft (10 of those hours may be in an approved simulator). For these purposes a cross-country flight is one which covers at least 50 nautical miles from takeoff to destination airport.

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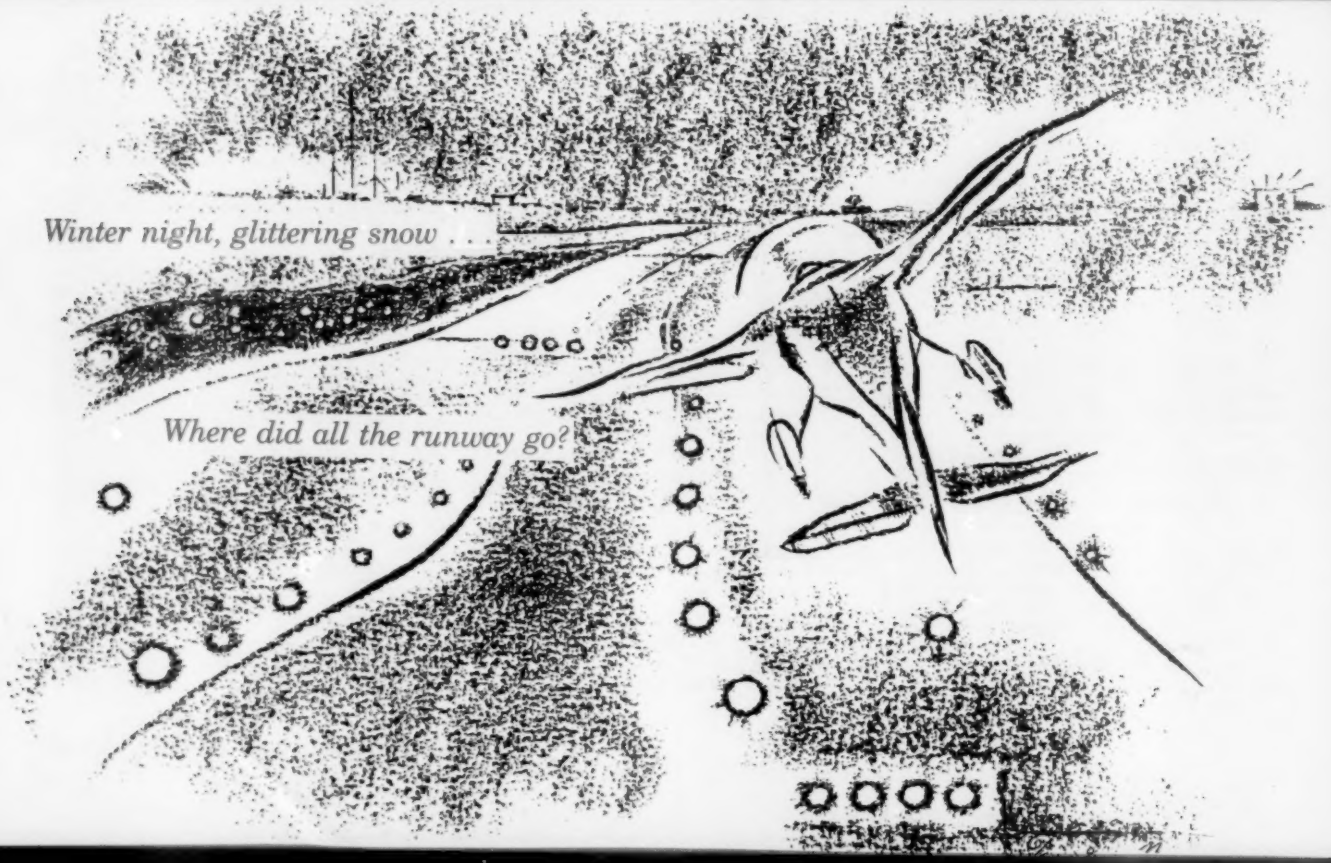
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